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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte FRANK ELIOT LEVINE,
ENIO MANUEL PINEDA, and
ROBERT JOHN URQUHART

Appeal 2009-009798
Application 10/674,606
Technology Center 2100

Before: HOWARD B. BLANKENSHIP, THU A. DANG, and
DEBRA K. STEPHENS, *Administrative Patent Judges*.

STEPHENS, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134(a) from a final rejection of claims 1-3, 5-10, 12-17, and 19-24. Claims 4, 11 and 18 have been canceled. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

Introduction

According to Appellants, the invention is related to a method, apparatus, and computer instructions for “hardware assistance to software tools in obtaining performance data in a data processing system.” The method, apparatus, and computer instructions monitor execution of a program using a processor. Call and return instructions are associated with a set of indicators which cause the executing processor to generate data on the calls and returns. (Abstract; Spec. 3, 1).

STATEMENT OF CASE

Exemplary Claim(s)

Claim 1 is an exemplary claim and is reproduced below:

1. A method in a data processing system for monitoring the execution of a program, the method comprising:

in a system having an indicator location associated with each instruction, storing a respective indicator in the indicator location associated with each call and return in the program;
and

executing the program using a processor, wherein the respective indicators associated with the calls and returns cause the processor executing the instructions to generate data on calls and returns in the program.

Prior Art

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Subrahmanyam	US 5,987,250	Nov. 16, 1999
Smolders	US 6,253,338	Jun. 26, 2001
Buser	US 2004/0030870 A1	Feb. 12, 2004

FOLDOC: The Free Online Dictionary of Computing. Entry for “jump” (11/14/1998), <http://foldoc.org/foldoc.cgi?jump> (last visited 7/19/06).

Computeruser.com. High-Tech Dictionary. Entry for “Unconditional branch,” <http://www.computeruser.com/resources/dictionary/definition.html?lookup=5638> (last visited 7/19/06).

Bryan Pfaffenberger, *Webster's New World Computer Dictionary*, p. 52 (Hungry Minds, 9th ed. 2001).

REJECTIONS

Claims 1, 8, 15, and 22-24 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Smolders and Buser (Ans. 4-5).

Claims 2-7, 9-14, and 16-21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Smolders, Buser, and Subrahmanyam (Ans. 5-8).

GROUPING OF CLAIMS

(1) Appellants argue claims 1, 8, 15, and 22-24 as a group on the basis of claim 1 (App. Br. 8-16). We accept independent claim 1 as the representative claim. We will, therefore, treat claims 8, 15, and 22-24 as standing or falling with representative claim 1.

(2) Appellants argue claims 2, 6, 9, 13, 16, and 20 as a group on the basis of claim 2 (*id.* at 17-20). We accept claim 2 as the representative claim. We will, therefore, treat claims 6, 9, 13, 16, and 20 as standing or falling with representative claim 2.

(3) Appellants argue claims 3, 5, 7, 10, 12, 14, 17, 19, and 21 as a group on the basis of claim 3 (*id.* at 20-25). We accept claim 3 as the representative claim. We will, therefore, treat claims 5, 7, 10, 12, 14, 17, 19, and 21 as standing or falling with representative claim 3.

We accept Appellants' grouping of the claims. *See* 37 C.F.R. § 41.37(c)(1)(vii).

ISSUE 1

35 U.S.C. § 103(a): claims 1, 8, 15, 22-24

35 U.S.C. § 103(a): claims 2-7, 9-14, and 16-21

Appellants argue that the Examiner has not shown a teaching, suggestion, or motivation to combine (i) Smolders and Buser and (ii) Smolders, Buser, and Subrahmanyam and each reference addresses a different problem (App. Br. 13-14, 17-18, and 20-21; and Reply Br. 6-7). Specifically, Appellants argue Smolders is not “concerned with honoring a common breakpoint among multiple processors” as is Buser (App. Br. 14). Additionally, Appellants contend that Smolders is directed to reducing overhead costs of using API calls while maintaining higher granularity and Buser is directed to reducing debugging problems when common shared memory contains executable code (App. Br. 14-15). Thus, Appellants assert Smolders and Buser address different problems (App. Br. 14-16).

Appellants further argue the Examiner did not provide a motivation to combine Smolders, Buser, and Subrahmanyam but instead, provided only a motivation to combine Smolders and Subrahmanyam (App. Br. 17-18 and 20-21). Appellants further assert no motivation exists to combine smolders, Buser, and Subrahmanyam because each reference addresses different problems (App. Br. 18-20, 24, and 25).

Issue 1: Has the Examiner erred in concluding (i) Smolders and Buser are properly combinable (with respect to the rejections of claims 1, 8, 15, and 22-24) and (ii) Smolders, Buser, and Subrahmanyam are properly combinable (with respect to the rejections of claims 2-7, 9-14, and 16-21)?

ANALYSIS

The Examiner has cited Buser for teaching or suggesting indicators being in a field associated with each instruction for holding a potential indicator (Ans. 4). We find that Buser teaches or suggests using an indicator (halt identifier) and determining if that indicator is associated with a particular task, a particular process, or a particular thread of execution on the processor (pg. 1, [0003]-[0004]; claims 1, 2, and 4). Each instruction may have an associated identifier (Fig. 1; pg. 2, [0018]). Additionally, Buser teaches that this technique may be used to aid in debugging (or tracing the process) during application development (pg. 1, [0003]). Smolders is also directed toward tracing a process (Abstract).

Thus, we find an ordinary artisan at the time of the invention would have possessed the skill necessary and would have been motivated to include an indicator in a field associated with each instruction for holding each indicator, that is used in determining action for a particular task, process or

thread of execution on the processor. Additionally, we conclude that a skilled artisan would have found it obvious to include such an indicator in a location within each instruction into the system of Smolders to enhance Smolders' tracing so as to indicate a process to be performed.

Further, similarly unpersuasive is Appellants' argument that Smolders and Buser are directed toward solving different problems and thus, a skilled artisan would not have been motivated to combine the teachings (*see* App. Br. 14-16 and Reply Br. 6-7). The Examiner relies on the combined teachings of Buser (for teaching an "indicator" technique) and Smolders (for teaching a system for monitoring execution of a program and generating data on the execution of specific instructions) (Ans. 3-4). As set forth above, we find an ordinarily skilled artisan would have been motivated to implement Buser's technique into Smolders' system.

We further find one of ordinary skill in the art would have been motivated to combine Subrahmanyam's teaching of monitoring program behavior without affecting the program behavior instead of interrupting program execution as would occur in the system of Smolders (*see* Ans. 6 and 7). As set forth by the Examiner (Ans. 13), all three references are directed toward using specialized techniques to monitor, trace, debug, and otherwise analyze program behavior (Smolders, Abstract; Buser, Abstract; Subrahmanyam; Abstract). Additionally, as set forth above for the combination of Smolders and Buser, Appellants' arguments that the inventions set forth in Smolders, Buser, and Subrahmanyam are directed toward solving different problems (App. Br. 18-10 and 24-25) is unpersuasive. The Examiner has relied on these references for their respective teachings and, as set forth above, each teaches or suggests

techniques to monitor, trace, debug, and otherwise analyze program behavior. We thus find that one of ordinary skill in the art at the time of the invention would have been motivated to combine the techniques of Buser and Subrahmanyam into the system of Smolders.

Accordingly, Appellants have not shown that the Examiner erred in concluding (i) Smolders and Buser are properly combinable (with respect to the rejections of claims 1, 8, 15, and 22-24) and (ii) Smolders, Buser, and Subrahmanyam are properly combinable (with respect to the rejections of claims 2-7, 9-14, and 16-21).

ISSUE 2

35 U.S.C. § 103(a): claims 1, 8, 15, 22-24

Appellants assert their invention is not obvious over Smolders and Buser because the references do not teach or suggest the steps of “storing a respective indicator in the indicator location associated with each call and return in the program” and “executing the program using a processor, wherein the respective indicators associated with the calls and returns cause the processor executing the instructions to generate data on calls and returns in the program” (App. Br. 9-16). Specifically, Appellants assert the Examiner’s reliance on Smolders is misplaced because Smolders refers to a branch which is different than a call (App. Br. 9-12). Appellants further argue Smolders is only capable of counter events that occur between branch points, not data *on* calls and returns (App. Br. 12-13).

The Examiner finds calls and returns are branches and set rules do not exist for what constitutes a call or return (Ans. 9-10). The Examiner further finds an interrupt will call a subroutine and return to the program where

interrupted and data generation within the subroutine will be associated with the calls and returns (Ans. 10). Thus, Smolders describes “storing an indicator in the indicator location associated with each call and return in the program” (*id.*).

The Examiner further finds the claim’s recitation of “on” calls and returns may be interpreted as “upon encountering” calls and returns and such interpretation is not precluded by the other claims or the Specification (Ans. 11).

Issue 2: Has the Examiner erred finding Smolders discloses

- (i) “storing a respective indicator in the indicator location associated with each call and return in the program” and
- (ii) “executing the program using a processor, wherein the respective indicators associated with the calls and returns cause the processor executing the instructions to generate data on calls and returns in the program”

as recited in claim 1 and commensurately recited in claims 8 and 15?

ANALYSIS

Appellants’ arguments that Smolders does not teach or suggest “call and return” (App. Br. 9-12) is not persuasive. Smolders teaches a trace interrupt after each branch or at the end of each basic block of code from a currently running program or process (Abstract; col. 3, ll. 58–67). Smolders also teaches “sav[ing] the address of the beginning of the next basic block of code, which is the address where the interruption came from” (col. 4, ll. 31-34). Thus, we conclude that Smolders suggests “a store instruction [to allow

return to the current process] combined with a transfer of control instruction” to the trace routing which is consistent with Appellants’ provided definition of “call” (*see* App. Br. 10-11). We further conclude that choosing to structure a program to use branches, interrupts, or calls to bring “a computer program, a routine, or a subroutine into effect” is well within the skills of one of ordinary skill in the art at the time of the invention. As a result, we conclude Smolders teaches or suggests a “call and return.”

As to Appellants’ arguments that Smolders does not teach or suggest generating data *on* calls and returns (App. 12-13), we again find the arguments unpersuasive. Appellants contend their Specification discusses some of the data on calls and return that can be collected (App. Br. 12); however, Appellants do not define “data on calls and returns.” We additionally agree with the Examiner that Appellants are reading the limitation narrowly as data “about” calls and returns (Ans. 10). However, reading the term broadly, consistent with the Specification and as would be attributed by one of ordinary skill in the art at the time of the invention, we find that Smolders teaching of storing of information before the trace interrupt is executed as well as trace information during the trace teaches or suggests generating data on (upon) calls and returns (Ans. 10; *see also*, col. 4, ll. 21-34).

Appellants’ additional arguments presented in the Reply Brief have not been considered. Appellants have not explained why, nor is it apparent that, these arguments were necessitated by a new point in the Answer or any other circumstance constituting “good cause” for its belated presentation. *See Ex parte Borden*, 93 USPQ2d 1473, 1473-74 (BPAI 2010) (informative) (absent a showing of good cause, the Board is not required to address

arguments in the Reply Brief that could have been presented in the principal Brief).

Accordingly, Appellants have not shown the Examiner erred in finding the combination of Buser and Smolders would have taught or suggested a “call and return” and “generat[ing] data on calls and returns” as recited in independent claims 1, 8, and 15. Appellants have not shown the Examiner erred in finding Smolders and Buser teach or suggest the invention as recited in independent claims 1, 8, and 15, and dependent claims 22-24 which were not separately argued.

ISSUE 3

35 U.S.C. § 103(a): claims 2, 6, 9, 13, 16, and 20

Appellants argue claim 2 on the basis of the arguments set forth for claim 1. As set forth above, we find that the combination of Smolders and Buser would have taught or suggested the invention as recited in claim 1. Appellants provide no additional arguments with respect to the limitation set forth in claim 2. Therefore, claim 2 falls with claim 1. Since Appellants did not present separate arguments for claims 6, 9, 13, and 16, claims 6, 9, 13, and 16 fall with claim 2.

ISSUE 4

35 U.S.C. § 103(a): claims 3, 5, 7, 10, 12, 14, 17, 19, and 21

Appellants assert their invention as recited in claim 3 is not obvious over Smolders, Buser, and Subrahmanyam because Subrahmanyam does not teach or suggest the limitations of claim 3 (App. Br. 20-25). The Examiner responds in the Answer, page 14, that Appellants seem to be arguing claim

5. However, Appellants did not provide any clarification or response in their Reply Brief to this issue. Thus, based on Appellants' arguments addressed to claim 3, Appellants are arguing limitations that are not recited in the claim.

Accordingly, Appellants have not shown the Examiner erred in finding the combination of Smolders, Buser, and Subrahmanyam would have taught or suggested the invention as recited in claim 3.

CONCLUSION

Appellants have not shown the Examiner erred in rejecting claims 1, 8, 15, and 22-24 under 35 U.S.C. § 103(a) for obviousness over Smolders and Buser.

In addition, Appellants have not shown the Examiner erred in rejecting claims 2-7, 9-14, and 16-21 under 35 U.S.C. § 103(a) for obviousness over Smolders, Buser, and Subrahmanyam.

DECISION

The Examiner's rejection of claims 1, 8, 15, and 22-24 under 35 U.S.C. § 103(a) as being obvious over Smolders and Buser is affirmed.

The Examiner's rejection of claims 2-7, 9-14, and 16-21 under 35 U.S.C. § 103(a) as being obvious over Smolders, Buser, and Subrahmanyam is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv) (2011).

Appeal 2009-009798
Application 10/674,606

AFFIRMED

msc